BEFORE THE

WASHINGTON UTILITIES & TRANSPORTATION COMMISSION

DOCKET NO. UE-01_______

EXHIBIT NO. _____ (KON-16)

WITNESS: KELLY O. NORWOOD, AVISTA CORP

2001 SUMMER SPECIAL ASSESSMENT

Reliability of the Bulk Electricity Supply in North America

North American Electric Reliability Council

May 2001

Table of Contents

Introduction 2

Executive Summary 3

Special Assessment — California ISO 4

Table 1: Installed CAISO Resource-Type Breakdowns (remotely owned generation excluded): 6

Table 2: California ISO Summer 2001 Demand and Resource Projections 7

Table 3: CAISO and NERC Summer Peak Projections 12

Table 4: Expected Hours of Unserved Energy — NERC Estimates 13

Supplemental Information 14

Special Assessment — Northwest Power Pool Subregion 16

Figure 1: Current and Historical Water Volume Runoff at the Dalles Dam 18

Introduction

As a supplement to its *2001 Summer Assessment* report, the NERC Reliability Assessment Subcommittee (RAS) has conducted an in-depth independent examination of the expected summer conditions in California and the Pacific Northwest. The results of this examination are presented in this report.

This report is an assessment of the expected demand and available resources to meet that demand this summer. It also addresses transmission reliability issues. NERC does not make projections or draw conclusions regarding expected energy prices.

Executive Summary

Due to concerns relating to the ability of the California Independent System Operator (CAISO) and the Pacific Northwest (Northwest Power Pool–NWPP) to serve electricity demand during summer 2001, the RAS conducted an in-depth analysis of each area on behalf of NERC. Both of these assessments are the result of interviews with experts from both the CAISO and the NWPP.

The NERC CAISO assessment agrees with the overall conclusions of both the CAISO and the Western Systems Coordinating Council (WSCC); namely, that the CAISO will not have sufficient resources to meet expected demand this summer and that involuntary curtailments of firm customer demand (rotating blackouts) are expected. However, the expected conditions in the NERC assessment are more severe than the expected CAISO and WSCC conditions, in part because the NERC assessment is based on more current information. NERC anticipates that firm demand may be curtailed for about 260 hours over the course of this summer, with an average amount of firm demand curtailed of about 2,150 MW in each instance.

The NERC NWPP assessment concludes that this subregion will serve all firm electricity commitments this summer. However, due to limited energy output from hydroelectric facilities resulting from severe drought conditions, NWPP will not have the ability to export the amounts of electricity it traditionally has to California or elsewhere.

Special Assessment — California ISO

Introduction

NERC's Reliability Assessment Subcommittee (RAS) developed this special assessment based on information gathered during an interview conducted with the California ISO (CAISO) and from the *California 2001 Summer Assessment* report published by the CAISO on March 22, 2001. This NERC assessment pertains only to the CAISO, whose control area covers the majority, but not the entirety of the state of California. The Western Systems Coordinating Council (WSCC) self-assessment included in the NERC *2001 Summer Assessment* report details WSCC's summer outlook for California, which reflects the CAISO projections. The NERC *2001 Summer Assessment* report includes capacity margins on a NERC Regional and subregional basis and not a state-by-state basis. It is important for readers to note that the WSCC California subregion includes more than just the CAISO. A map of the CAISO is included in the supplemental information section of this report.

The California electricity supply and demand situation is in a state of flux as the California legislature has several proposals before it that may impact customer demand in the state this summer. NERC has included estimates of the impacts of those programs announced at the time this special assessment was published.

This assessment lists the summer 2001 assumptions and conclusions made by CAISO, followed by the NERC analysis.

Executive Summary

Projections made by the CAISO in its March 22 report indicate that resources will not be sufficient to meet peak demand requirements this summer and that resource limitations may also lead to shortfalls during non-peak times. NERC believes that the CAISO and WSCC have identified all potential problems that may be experienced in California this summer and concurs with the overall conclusion that there will be supply deficiencies. However, based upon current information, some of which was not available when the CAISO's report was written, NERC believes the deficiencies will be more severe than projected by the CAISO because many of the assumptions the CAISO included in its March 22 assessment now appear overly optimistic. While NERC believes that peak demand in the CAISO control area will be less than that projected by the CAISO due to demand response to recent rate increases and new conservation programs not included in the CAISO assessment, this decrease is more than offset by concerns regarding the amount of available resources to serve the demand.

NERC estimates that the CAISO will most likely experience supply deficiencies in the range of about 4,500–5,500 MW at the time of peak demand for each summer month (2,000–4,000 MW more than the CAISO projections, depending upon the month selected) and expects involuntary curtailments of firm demand (rotating blackouts) to occur. Based on the results of an independent loss of load probability study, NERC further estimates that firm demand may be curtailed for about 260 hours this summer and that the average amount of firm demand curtailed will be about 2,150 MW. The actual magnitude and duration of firm demand curtailments will depend heavily on the effectiveness of demand conservation efforts and the continued ability of CAISO operators to take appropriate action during emergencies. The CAISO has already developed plans to curtail up to 6,000 MW of firm demand if necessary.

CAISO Projections

Demand

The summer peak demand forecast used by the CAISO assumed normal weather but extended the peak demand across all summer months. While the CAISO believes the peak demand for the summer will occur in August, its projections assume the peak will occur in each month this summer, reflecting the uncertainty involved with weather forecasting and the sensitivity of California's demand to temperature.

Recently, the California Public Utilities Commission (CPUC) approved a significant rate increase for customers of Southern California Edison Company and Pacific Gas and Electric Company, but the impacts of this increase upon projected demand have not been included in the CAISO projections, since this development occurred after the CAISO report was published.

The interruptible demand program in northern California was exhausted early this year as the CAISO operators were forced to call upon interruptible customers to counteract the high unavailability of generating resources during the 2000/2001 winter. Previously, the CAISO could count on about 2,400 MW of interruptible demand in southern California. However, the CPUC waived the non-performance penalties associated with the interruptible program earlier this year, effectively reducing the impact of this operating tool to between 100–200 MW. On April 3, 2001, the CPUC issued an interim order that would restore penalties and also provide a financial mechanism for the PG&E interruptibles to participate this summer. Because of a 30-day opt-out window, the exact impact of the CPUC changes on the interruptible demands will not be known until late May. The CAISO does have a demand relief program expected to provide about 500 MW, which is expected to be fully operational by June 1, 2001.

Additionally, the California Department of General Services (DGS), which oversees about 500 million square feet of state office space, has committed to continue to reduce demand throughout the state again this year when the CAISO declares a Stage 2 emergency (the supplement to this report contains information regarding the CAISO emergency states). To determine the impact of this conservation measure, the DGS and CAISO are planning a test on May 8, 2001. Until that time, the CAISO cannot estimate the impact of this demand reduction and has therefore not included it in its analysis.

The California legislature and the CPUC have several proposals before them to encourage demand responsiveness and others to exempt certain customers from involuntary interruptions. Until these plans are finalized and approved, their impact upon California demand for electricity is difficult to determine. Each day that passes reduces the short-term effectiveness of the programs, as they take time to implement.

Resources

The CAISO projects that from 40,860 to 43,841 MW of generation will be available to serve peak demand this summer. This amount includes CAISO entitlements of remotely owned generation outside the control area, all new capacity additions planned to be in service this summer, and the expected availability of qualifying facilities (QFs) within the CAISO control area. The CAISO available capacity projections reflect derates associated with the output of wind-powered generation during peak times, the reduced output expected from internal CAISO hydroelectric facilities, the expected availability of QFs to serve demand when called upon, and unplanned outages of generating facilities. The CAISO projections do not include any adjustments to account for reduced availability of resources due to emissions limitations or for financial reasons. Planned outages are assumed to be zero throughout the summer, because the CAISO has issued a moratorium on planned outages for the summer.

Based upon historical performance, the CAISO has derated the amount of QFs available to serve CAISO demand to about 5,800 MW (out of 10,300 MW). This derate incorporates the historical availability of the

QFs and adjustments to account for the many QFs that net their output against their demand (thus the demand associated with the QFs is not included in the demand forecast). Finally, the CAISO has no scheduling authority with many QFs, because the QFs are under direct contract with California utilities and this, too, was included in the derate.

The CAISO projects about 3,000 MW of new capacity to be available by the end of this summer, the bulk of which will not be available until late in the summer. The CAISO cannot verify the 5,000 MW of new capacity that some believe will be available this summer.

The CAISO experienced unusually high generator forced outage rates this past winter. Last summer, however, the CAISO had only about 2,500 MW forced out on average and has included this value in its estimates for this summer.

To mitigate operating emergencies this past winter, many generators were forced to operate for unprecedented durations and may well exhaust their available emissions credits prior to or during the summer. The CAISO recently reached agreements with the Federal EPA and state and local environmental agencies to obtain waivers or permits for generating units at or near their prescribed emissions levels to continue to generate energy, to the extent that committing these units will avoid calling a Stage 3 emergency or will avoid involuntary firm demand curtailments. The resource projections for the CAISO assume that environmental limitations will not render any generation unavailable.

Table 1: Installed CAISO Resource-Type Breakdowns (remotely owned generation excluded):

Type	Nameplate Capacity (MW)	Percentage of Total Resources (%)
Nat Gas/Oil	16,795	36.1
Hydro	1,1801	25.3
Cogeneration	5,892	12.6
Nuclear	4,358	9.4
Peakers	2,239	4.8
Wind	1,883	4.0
Geothermal	1,293	2.8
Biomass	1,041	2.2
Coal	922	2.0
Solar	379	0.8

Note: Overall, there are approximately 10,300 MW of qualifying facilities (QFs) in the CAISO control area, comprising 22% of the resource mix. Based on actual QF generation recorded over the 2000 summer months, it is expected that approximately 5,800 MW will be available to serve demand this summer. This derate includes demand netted against QF generation, wind derates, and the fact that the CAISO energy management system (EMS) does not have the ability to determine the operational status of all QFs.

Imports from surrounding regions have been steadily decreasing each year. Typical net CAISO imports were on the magnitude of 8,000 MW in summer 1999, decreased to 5,000–6,000 in summer 2000 and may be as low as 3,500 MW this summer. These values do not include the remotely owned generation that is dynamically scheduled into the CAISO control area. Imports from the Pacific Northwest will be severely limited due to low water conditions and their impact on the output of hydro facilities in that area. Water levels and stream flows are the lowest they have been in about 50 years and may be the worst ever, depending upon spring rains.

In spite of the tight capacity situation in the CAISO control area, the CAISO has seen electricity exports from generation owners in its control area increase dramatically. Many generation owners inside the CAISO control area are not obligated to sell electricity to the CAISO and are free to sell to other markets. Exports have nearly tripled from the summer of 1999 to the summer of 2000. The CAISO does not have an estimate of expected exports for this summer due to the dynamics of the California market, but the potential exists for a further increase. Regardless, the decrease in net imports each summer is cause for concern in California.

Resource and Demand Balance

The CAISO projects capacity deficiencies of up to 3,647 MW (even after utilizing its non-spinning operating reserves) at time of peak each month as shown in Table 2 below.

Table 2: California ISO Summer 2001 Demand and Resource Projections (Source:* CAISO 2001 Summer Assessment *report)

	CONTROL AREA PEAK DEMAND (MW)	SUMMER 2001			
		JUNE	JULY	AUGUST	SEPT
1	Forecast Summer Season Peak Load	47,703	47,703	47,703	47,703
2	Operating Reserve Requirements	2,600	2,600	2,600	2,600
3	Estimated Total Control Area Capacity Requirement	50,303	50,303	50,303	50,303
	CONTROL AREA GENERATION RESOURCES (MW)				
4	Maximum Net Dependable Capacity of CAISO Control Area Resources (as of February 2001)	42,113	42,113	42,113	42,113
5	Dynamic Schedules into CAISO	1,857	1,857	1,857	1,857
6	Expected New Generation (Cumulative Totals)	390	2,593	2,789	3,371
7	Scheduled Outages	0	0	0	0
8	Estimated Forced Outages/Capacity Limitations	-2,500	-2,500	-2,500	-2,500
9	Estimated Hydro Capacity Limitations	-1,000	-1,000	-1,000	-1,000
10	Estimated Control Area Resource Capacity (at peak)	40,860	43,063	43,259	43,841
	GENERATION IMPORTS (MW)				
11	Required Net Imports (Line 3 — Line 10)	9,443	7,240	7,044	6,462
12	Forecast Net Imports at Peak	3,500	3,500	3,500	3,500
13	Estimated Resource Deficiency Before Mitigation Measures	-5,943	-3,740	-3,544	-2,962
	DEFINITIVE MITIGATION MEASURES (MW)				
14	Utility Distribution Company (UDC) Interruptible Load Curtailments	400	400	400	400
15	Demand Relief Programs	596	596	596	596
16	Conversion of Non-Spinning Reserve to Energy	1,300	1,300	1,300	1,300
17	**RESOURCE DEFICIENCY AT PEAK (MW) after definitive mitigation measures**	-3,647	-1,444	-1,248	-666

Transmission
Reinforcements have been added to address transformer overloads and low voltages that led to one instance of rotating blackouts in the San Francisco Bay area last summer. A new 500/230 kV transformer is expected to be in service prior to the summer in northern California, which will alleviate other transformer overloads in the area. Even with these additions, the CAISO may be forced to implement overload relief or other emergency operating procedures under certain conditions.

Electricity transfers into and through California are limited primarily by the California-Oregon intertie (path 66), the connection between northern and southern California (path 26) and a key internal northern California path (path 15). Last summer the reduced availability of electricity from outside California reduced loadings on transmission facilities used to import electricity into California, rendering transmission constraints a non-issue vis-à-vis energy imports. This condition is expected to repeat this summer. Paths 15 and 26 may be an issue, however, as they limit the amount of electricity that can be transferred between southern and northern California.

The supplemental section of this report contains a map showing the approximate location of key internal CAISO transmission paths.

Operations
The CAISO operations department has already begun contingency planning for the summer, including preparations to shed as much as 6,000 MW of firm customer demand if necessary. To improve overall system security and to comply with WSCC criteria, the CAISO has increased its minimum spinning reserve from 1.5% to 3.5%, to cover the loss of the single largest internal generating unit in the control area plus some regulating reserves.

CAISO also revised the definition of Stage 3 Emergencies; Stage 3 is now defined as having insufficient spinning reserve to cover the largest single contingency, or on average 1,400 MW. This change has been made to ensure that the loss of the single largest contingency within the CAISO control area would not have a detrimental impact on the security of the rest of the WSCC Interconnection. The remaining operating reserves required by WSCC will be carried under the California utilities Manual Deep Load Shedding (MDLS) programs.

A description of the CAISO emergency operating procedures is included as a supplement to this report.

NERC Analysis and Projections

NERC believes that summer 2001 peak demand in California will be lower than projected by the CAISO, but overall conditions may be worse than the expected conditions projected by the CAISO for the reasons that follow. Table 3 shows the differences in the CAISO and NERC assumptions.

Demand
The CAISO demand projections are based upon normal weather, which is consistent with industry practice. The forecast does not include any expected impacts of any demand responsiveness programs currently pending before the state legislature or of consumer response to the proposed rate increases in the state, because these activities occurred after the release of the CAISO's assessment report. Although it is difficult to assess the exact impact of the demand responsiveness programs until their final details are known, NERC feels that some estimate of their impacts must be included. Based upon a reasonable range of demand elasticity, NERC estimates that consumer response to the rate increase has the potential to reduce peak demand by 1,950 MW.

California recently unveiled a conservation program that it believes will reduce peak demand in the state by 3,920 MW this summer. However, only about 1,250 MW of associated CAISO demand reductions are based upon existing or well-established programs; the remainder have received approval and funding by the state legislature, but have yet to be developed and implemented. Even if fully operational, most of the savings attributable to the new programs will not occur until August and September. For these reasons, NERC has incorporated 1,250 MW of peak demand reductions in response to the conservation programs, with the hope that these programs will be significantly more effective than that.

NERC used the CAISO peak demand forecast as its starting point in Table 3; the NERC adjustments listed above are reflected in lines 14, 15, and 15a.

Under extreme weather conditions, NERC estimates that CAISO demand may be 2,500 MW higher at peak than projected by the CAISO. The extreme weather case is not likely, though.

Resources

Unplanned Outages — The CAISO projection of 2,500 MW of unplanned or forced outages for this summer is somewhat optimistic given the recent outage rates of generation internal to the CAISO. The majority of the generating facilities are over 30 years old and have recently been subjected to higher levels of service hours than predicted by their owners, due to recent reduced availability of hydro resources and external system purchases. This past winter, unplanned generator outages were as high as 6,800 MW at times. Although much maintenance was performed over the winter, some outages had to be delayed or prematurely ended to respond to system emergencies. Thus, NERC questions whether the maintenance performed recently will significantly improve unit performance.

The CAISO assumes that San Onofre Unit 3 will be available to serve peak demand each month this summer, based upon information available in March when their summer assessment was published. Currently, San Onofre Unit 3, a 1,080 MW nuclear generator is out of service for a maintenance outage and may not return to service until late July. San Onofre Unit 3 was out of service for a refueling outage earlier this year and experienced some equipment failure when attempting to return to service. NERC assumed that San Onofre Unit 3 will not be available to serve demand in June and July and reduced the capacity resources available to the CAISO by 1,080 MW.

The CAISO assumes that new generation scheduled for the summer will be 100% available, on schedule, as planned. Since new generation requires a 'shake-down' period during initial start-up and may experience higher forced outage rates during that time, it is unlikely that all of the new generation will be on schedule and 100% available.

The actual five-year historical summer average equivalent availability for all California fossil-fired generation as reported in the NERC Generation Availability Data System (GADS) is about 86%. Based upon this statistical information, uncertainties regarding the effectiveness of recent maintenance outages and the age of the CAISO generation facilities, NERC believes that a more appropriate expected average level of forced outages this summer is about 4,525 MW, almost twice as much as the CAISO projection.

Planned Outages — The CAISO has more involvement in the planned outage process this summer than in the past. The CAISO will not approve any planned outages scheduled for the summer months. This does not mean that these outages will not occur, since some generation owners have expressed the intention to take maintenance outages over the summer, and the CAISO does not have authority from the state legislature at this time to issue any sanctions against those entities that disregard its mandates. Even if penalties can be issued this summer, it is not clear if the penalties will be sufficient to encourage adherence to CAISO mandates. NERC feels the CAISO assumption that no planned outages will occur this summer is optimistic. However, NERC believes that the adjustment made to expected summer CAISO forced outages is adequate to address any planned outages that may occur during the summer and therefore has not included an adjustment in its assessment.

Other Outages–Environmental — The CAISO recently reached agreements with the Federal EPA and state and local environmental agencies to obtain waivers or permits for generating units at or near their prescribed emission levels to continue to generate electricity, if committing these units will avoid calling a Stage 3 emergency or will avoid involuntary firm demand curtailments. These agreements alleviate NERC concerns in this area and thus NERC did not reduce the CAISO available capacity projections to include environmental related derates.

NERC does not know if California generation owners outside the CAISO have reached similar agreements.

Other Outages–Economic Considerations — The CAISO projections assume all available generators in the control area are willing to sell to the CAISO or to the state of California. This may not be the case, as evidenced this past winter when many generators, including QFs refused to sell to the CAISO for credit concerns and fear of non-payment. As much as 3,000 MW of QFs were offline and did not sell electricity to the CAISO for financial reasons this spring. Furthermore, FERC recently issued an order that provides energy sellers the option to not sell to entities with suspect credit ratings. Absent any definitive information, NERC did not incorporate any impacts into its calculations.

At the time of this writing, price caps were not in place in California; if they are imposed they may impact CAISO operations, depending upon the cap threshold price and geographic coverage. NERC did not include any impacts of price caps in its California projections.

Hydro Facilities — The CAISO reduced the amount of capacity expected from hydroelectric facilities at peak by 1,000 MW based upon historical data. The CAISO reduction is based on normal precipitation and reservoir levels; however, indications are that reservoir levels in California will be below normal this summer. It is difficult to assess the exact impact of the reduced availability of hydro resources without detailed information regarding the reservoir levels, snow pack and runoff, but NERC believes it will be more than 1,000 MW. As seen in Table 1, the CAISO depends upon hydropower for 11,801 MW or 25% of its installed generation. The impact of hydro limitations will likely be more keenly felt during non-peak times because although the facilities will be able to generate full capability for an hour or two to meet peak demand, they will not be able to sustain high levels of output throughout the day.

The California Department of Water Resources is forecasting an April–July runoff of 55% of average. For this reason, coupled with the reduced reservoir levels, NERC has further increased the CAISO hydro derate by an additional 1,800 MW (or 2,800 MW total derate) by the end of the summer. NERC expects this derate to be in the range of 1,200 MW in June and to increase each summer month to the 2,800 MW derate level as hydro resources are used to meet summer demand.

New Capacity Additions — NERC did not include any new generation not already sited, permitted or under construction in its assessment of the CAISO. On this basis, NERC identified about 1,500 MW of new capacity in the CAISO control area that is expected to be operational by the end of the summer. However, because the majority of the new capacity is not expected to be available until late in the summer, it will not be available to serve high demands that may occur in June and July.

NERC did not include any of the temporary generation that may be installed throughout the CAISO control area. No definitive information regarding these generators and their likelihood of being in service this summer was available when this report was written.

As previously mentioned, new generation may experience higher than normal unit unavailability at initial start-up.

Imports/Exports — The CAISO net import projections account for reduced availability of outside support due to demand growth in neighboring areas and extremely low hydro reservoir and snow pack levels in the Pacific Northwest. Imports from the Pacific Northwest are included in the planned capacity resources of the CAISO this summer; however, these resources are not likely to be available to the CAISO. Electricity generators in the Pacific Northwest have stated that they will be able to serve their firm demand and firm sales this summer, but will not have excess electricity available to export to California, due to reduced hydro generator output.

For the reason above, NERC estimates that the 3,500 MW of net imports reported by the CAISO in its assessment should be reduced by 1,000 MW.

Resource and Demand Balance

Table 3 compares the CAISO resource projections to those expected by NERC, based upon the items listed previously. NERC believes that the CAISO may experience peak deficiencies ranging from about 4,500 to 5,500 MW this summer. These projections exceed the deficiencies predicted by the CAISO by 2,000–4,000 MW, depending upon the month selected.

The values in Table 3 are what NERC considers as the most likely summer 2001 CAISO conditions. NERC estimates that under best-case conditions, the CAISO would have about a 2,500 MW surplus over its required resources and that under worst-case conditions, the CAISO will experience a deficiency in the magnitude of 13,000 MW. Both of these cases are deemed unlikely.

CAISO has also developed "best case" and "worst case" resource scenarios. The CAISO's "Adverse Outlook" scenario estimates resources of 6,500 MW less than expected conditions. The CAISO's "Favorable Outlook" scenario estimates resources of 5,000 MW more than expected conditions. NERC believes the CAISO's "Adverse Outlook" resource scenario to be the most probable condition.

NERC believes that the CAISO may experience operating emergencies during not only the peak periods, but also during non-peak periods, due primarily to its dependence upon energy limited hydro resources. Using the NERC estimates of available resources to serve demand and historical CAISO demand data, OnLocation, Inc./Energy Systems Consulting conducted a probabilistic analysis of the summer months at the direction of NERC. Each generating unit in the CIASO control area was modeled discretely and assigned a forced outage rate consistent with NERC's projections in the analysis. The demand data used is based on 30-year historical temperature frequency distributions. A Monte Carlo simulation, which incorporated the NERC assumptions regarding the probability of generating unit outages together with the demand model, was used to determine the number of hours during the summer season that capacity shortages may occur. The results of the analysis are summarized in Table 4.

NERC's best estimate is that there will be about 260 hours of exposure to involuntary firm demand curtailment (rotating blackouts) in the CAISO control area during the course of this summer, with an average of about 2,150 MW being involuntarily curtailed in each instance. An identical analysis using the CAISO assumptions yields about 55 hours of exposure to involuntary curtailments, with an average of 1,825 MW curtailed.

Table 3: CAISO and NERC Summer Peak Projections

	CONTROL AREA PEAK DEMAND (MW)	CAISO PROJECTIONS				NERC PROJECTIONS			
		JUNE	JULY	AUG	SEPT	JUNE	JULY	AUG	SEPT
1	Forecast Summer Season Peak Load	47,703	47,703	47,703	47,703	47,703	47,703	47,703	47,703
2	Operating Reserve Requirements	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600
3	Estimated Total Control Area Capacity Requirement	50,303	50,303	50,303	50,303	50,303	50,303	50,303	50,303
	CONTROL AREA GENERATION RESOURCES (MW)								
4	Maximum Net Dependable Capacity of CAISO Control Area Resources (as of February 2001)	42,113	42,113	42,113	42,113	41,033	41,033	42,113	42,113
5	Dynamic Schedules into CAISO	1,857	1,857	1,857	1,857	1,857	1,857	1,857	1,857
6	Expected New Generation (Cumulative Totals)	390	2,593	2,789	3,371	0	500	1,000	1,500
7	Scheduled Outages	0	0	0	0	0	0	0	0
7a	Emissions Related Outages	0	0	0	0	0	0	0	0
7b	Unavailability due to Financial Concerns	0	0	0	0	0	0	0	0
8	Estimated Forced Outages/Capacity Limitations	-2,500	-2,500	-2,500	-2,500	-4,525	-4,525	-4,525	-4,525
9	Estimated Hydro Capacity Limitations	-1,000	-1,000	-1,000	-1,000	-1,200	-1,800	-2,400	-2,800
10	Estimated Control Area Resource Capacity (at peak)	40,860	43,063	43,259	43,841	37,165	37,065	38,045	38,145
	GENERATION IMPORTS (MW)								
11	Required Net Imports (Line 3–Line 10)	9,443	7,240	7,044	6,462	13,138	13,238	12,258	12,158
12	Forecast Net Imports at Peak	3,500	3,500	3,500	3,500	2,500	2,500	2,500	2,500
13	Estimated Resource Deficiency Before Mitigation Measures	5,943	3,740	3,544	2,962	10,638	10,738	9,758	9,658
	Definitive Mitigation Measures (MW)								
14	UDC Interruptible Load Curtailments	400	400	400	400	700	700	700	700
15	Demand Relief Programs & Conservation	596	596	596	596	1,250	1,250	1,250	1,250
15a	Response to Rate Increase	0	0	0	0	1,950	1,950	1,950	1,950
16	Conversion of Non-Spinning Reserve to Energy	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
17	**Margin at Peak (MW)** **after definitive mitigation measures**	-3,647	-1,444	-1,248	-666	-5,438	-5,535	-4,558	-4,458

Table 4: Expected Hours of Unserved Energy — NERC Estimates

Scenario	Hours Out	Avg. MW Out
NERC Assumptions		
No demand mitigation measures	700	3,150
With response to rate increase, no demand mitigation measures	480	2,575
With response to rate increase and demand mitigation measures	260	2,160

Note: Demand mitigation measures include interruptible demand, emergency conservation and other demand reductions not expected to be available during all summer hours.

Operations

Once again, the CAISO operations personnel will be challenged to deal with system emergencies on a daily basis this summer.

The CAISO's internal transmission constraints (Paths 15 and 26) for south-to-north electricity transfers will limit operator flexibility under certain conditions this summer, but NERC does not feel that these constraints will impact the resources available to the CAISO to serve demand this summer as much as the other factors previously listed in this report. For this reason, the NERC did not make any adjustments for transmission constraints.

The CAISO intends to increase the amount of spinning reserves it maintains from 1.5 to 3.5% (to cover the loss of the largest internal generating unit and some regulating reserves) to meet WSCC criteria. WSCC requires its members to maintain operating reserves (5% of the demand served by hydro resources and 7% of that served by thermal resources), half of which must be spinning and unloaded.

Supplemental Information

California ISO Emergency Procedures

A simplified summary comparison of Alerts, Warnings, and Emergencies may be characterized as follows:

- **Alert:** Notice to all Market Participants advising of marginal conditions (usually relative to Operating Reserve) and requesting market response for resolution;
- **Warning:** Notice to all Market Participants advising of marginal conditions (usually relative to Operating Reserve) and requesting market response for resolution, and additionally advising Market Participants that the CAISO may seek resolution by acquisition of resources through non-competitive means.
- **Emergency:** Notice to all Market Participants and/or to the public of conditions threatening electric system reliability (e.g., Operating Reserve and/or other system concerns) enabling out-of-market acquisition of resources and obligating response from all Market Participants as directed by the CAISO. That response may include, as appropriate, changes in generating resources and/or the curtailment of Utility Distribution Company (UDC) demand (voluntary and/or involuntary load reduction).

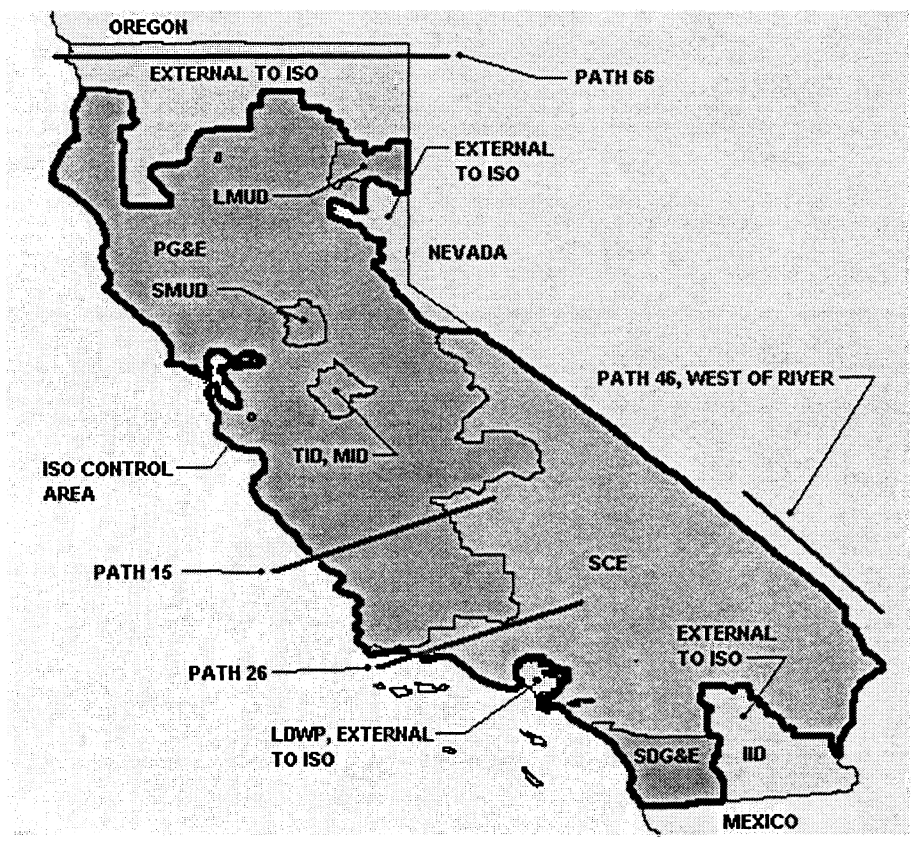
Emergencies can further be divided into Stage 1, Stage 2, and Stage 3 Emergencies, which are issued based on the level of severity. A simplified summary comparison of Stage 1, Stage 2, and Stage 3 Emergencies may be characterized as follows:

- **Stage 1:** Actual or anticipated Operating Reserves are less than WSCC Minimum Operating Reserve Criteria;
- **Stage 2:** Actual or anticipated Operating Reserves are less than or equal to 5%;
- **Stage 3:** Actual or anticipated Operating Reserves are less than or equal to 3.5%. (NOTE: The CAISO is increasing the threshold for Stage 3 from 1.5 to 3.5% to cover the loss of the largest unit in the CAISO control area plus some regulating reserves).

California ISO Description

A control area is defined as a geographic area that regulates its generation to balance supply and demand while maintaining planned interchange schedules with other control areas and assists in controlling the frequency of the interconnected system in accordance with WSCC and NERC criteria. The CAISO control area, shown in Figure 1 below, geographically includes most, but not all, of California. Three previous control areas: Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas and Electric Company (SDG&E) now comprise the CAISO control area. Municipalities such as Sacramento Municipal Utility District (SMUD), Modesto Irrigation District (MID), Turlock Irrigation District (TID), etc., which were within the three previous IOU control areas, are also within the CAISO control area. Utilities including, but not limited to, Los Angeles Department of Water and Power (LDWP), PacifiCorp (PAC), Imperial Irrigation District (IID), and Sierra Pacific Power Company (SPP) have their own control areas within California and are shaded in black in Figure 1 below.

Figure 1: CAISO Geographic Area
(Source: *CAISO 2001 Summer Assessment*)



Special Assessment — Northwest Power Pool Subregion

This report was developed based on information gathered during an interview conducted with the Northwest Power Pool (NWPP) staff and is augmented by information contained in the *Northwest Power Pool Area Assessment of Reliability and Adequacy — 2001 Summer Operating Conditions* report published by the NWPP on March 9, 2001. This report addresses the expected impact of drought conditions in the Columbia River Basin on hydroelectric system operations during the summer of 2001.

The NWPP subregion of the Western Systems Coordinating Council (WSCC) includes all or most of the states of Washington, Oregon, Idaho, Utah, Wyoming, Montana, Nevada (except for Las Vegas), northern California, and the Canadian provinces of Alberta and British Columbia.

Executive Summary

The NWPP area is expected to be able to serve firm internal demand requirements during the summer of 2001, assuming normal ambient temperature conditions, with no additional margin. Further reduction in water supply, extended forced outages to major thermal units, or higher than forecast peak demand or energy requirements will result in an internal energy shortfall. Neighboring WSCC subregions are not expected to be able to provide any significant energy assistance during the upcoming summer season, and internal energy deficiencies due to such resource losses or extreme high demand levels will likely lead to firm demand curtailments (rotating blackouts).

Although the NERC summer assessment report indicates that a 25.9% available capacity margin is anticipated at the time of the summer 2001 peak demand, this figure can be misleading. This capacity margin is based upon the maximum capabilities experienced during the 1936–37 water year, which are only slightly less than the nameplate ratings of the hydro facilities in the NWPP. Because hydro is an energy-limited resource and the entire Pacific Northwest is in a drought condition, the hydro facilities cannot maintain a near nameplate rated output or support a 25.9% capacity margin for more than an hour or two. NERC believes that a more representative available capacity margin for the subregion is about 15%, which takes into account the energy-limited nature of this resource. The 15% capacity margin should be sufficient to cover the NWPP's firm demand obligations and commitments, while maintaining an appropriate level of operating reserves.

Although the NWPP is expected to serve all firm demand this summer, unless significant amounts of precipitation occur in the subregion over the next several months, energy shortfalls are likely for winter 2001/2002.

Demand

The NWPP peak demand forecast for the summer of 2001 is 49,210 MW, based upon normal weather expectations. The actual 2000 summer peak was 50,396 MW (103% of forecast), due to hotter than normal weather conditions. During the summer peak of 2000, the NWPP was exporting about 1,500 MW to other WSCC subregions.

About 1,800 MW of contracted Direct Service Industrial (DSI) demand has been "bought down" by the Bonneville Power Administration, eliminating this demand component for the summer of 2001, and potentially for an extended period. Other price-sensitive industrial demands have curtailed demand due to existing high energy costs, and some with self-generation capability have reduced industrial production so they can sell the "saved" electricity to electric utilities.

Existing demand-side and conservation programs are expected to reduce peak demand by about 1,100 MW this summer. Additionally, aggressive public conservation initiatives will be implemented throughout the subregion this summer. These programs have the potential to provide additional demand relief during the upcoming summer season, but have not been included in the NWPP demand forecast.

Resources

Expected NWPP generation available to serve the summer 2001 peak demand is 71,259 MW, of which hydro generation comprises about 66%.

Hydro

If current drought conditions persist, 2001 will be one of the two lowest water years in the Columbia River Basin since record keeping began. The Columbia River volume runoff at the Dalles Dam for January through July 2001 is forecast to be 58.6 million acre-feet or about 55% of the long-term average of 105 million acre-feet. The record high January through July runoff level of 159 million acre-feet occurred in 1997. Figure 1 shows the current and historical water volume runoff at the Dalles Dam.

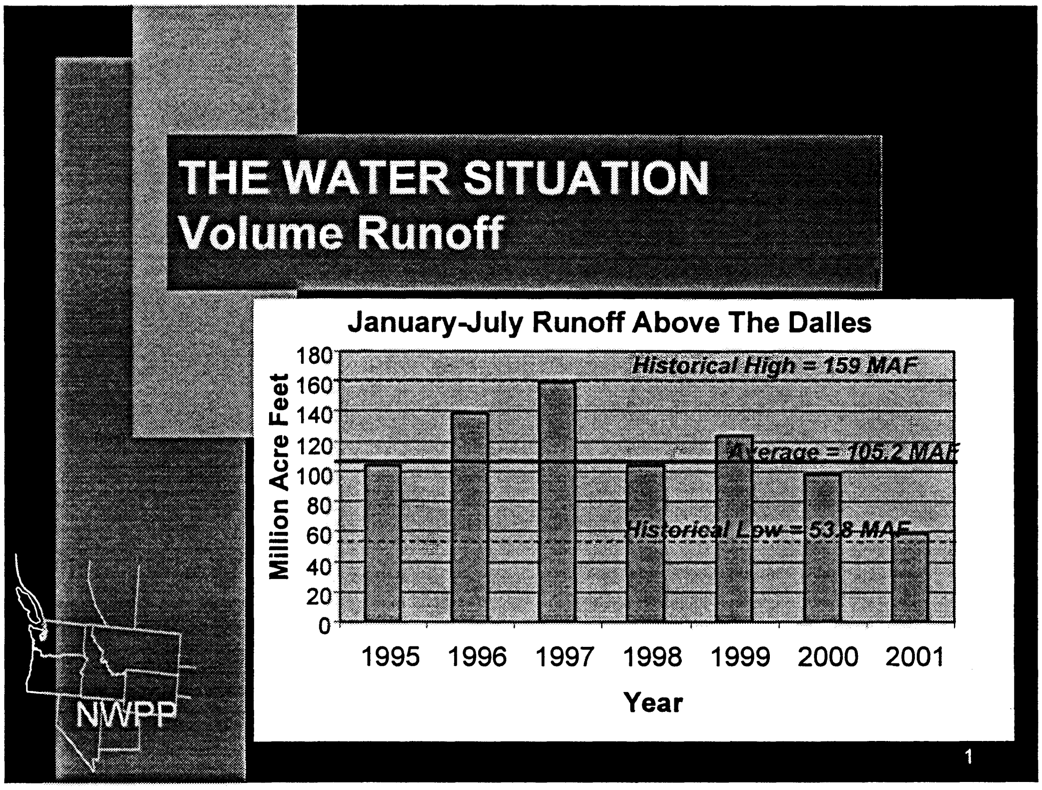
As a result of the exceptionally poor water conditions, expected energy production from the Coordinated System (Columbia River drainage) will be as much as 8,000 MW months less than normal for the remainder of the 2001 water year (May though July). Much of this missing energy would normally have been made available for non-firm sales to industrial customers within the subregion, or for export from the subregion.

The firm load serving capability of the Coordinated System is developed based on generation capacity using forecasted stream flows equivalent to those experienced in the August 1936 through July 1937 water year, considered to be the worst-case winter supply situation. Because the NWPP is a winter peaking subregion and stream flows are at their lowest during winter, the winter season hydroelectric energy capability is normally the most critical parameter for the NWPP system.

If the drought conditions encountered so far in the present water year persist into the summer, this water year could become the worst on record. Closer to normal precipitation during late March and early April 2001 have provided some hope that the drought is moderating. However, even a return to normal precipitation will probably not enable significant energy exports from the subregion this summer, although it will help mitigate an otherwise critical reservoir refill situation by the end of the summer. Continuing drought conditions will almost certainly limit the system's ability to refill reservoirs to minimum target levels in advance of the next winter season.

In addition to hydroelectric generation, the Columbia River is a key fish habitat, provides irrigation water for much of central Washington, and is an important recreational resource. The production of electricity must compete with these and other demands on Columbia River water. The extreme water conditions this year are expected to negatively impact a broad spectrum of activities due to the emergency suspension of many non-power operations on the hydro system.

Figure 1: Current and Historical Water Volume Runoff at the Dalles Dam (Source: NWPP)



Thermal

A number of planned thermal generating unit maintenance outages have had to be delayed or deferred due to the reduced energy output available from hydro resources. It is unclear what impact this delay will have on the availability and performance of these units during the summer. NERC's projected 15% average capacity margin should be sufficient to cover expected unit unavailability, but not enough to provide assistance to other subregions of WSCC.

Resource vs. Demand Balance

Although the various NWPP hydroelectric systems are able to produce exceptional amounts of electricity for a short period of time, the lack of water in the reservoirs this year will severely constrain the total energy capability of these systems. Electricity production at elevated levels cannot be sustained, since there is very little water stored in the hydro systems at present, and the inflows into the systems for the upcoming season are expected to be at or close to historically low levels. The net result is that extended periods of even moderately above-normal temperatures in the Pacific Northwest during the upcoming summer could overtax the energy capability of the hydro system, and could result in demand curtailments.

Transmission
Due to the forecasted lack of electricity for export, and the likely unavailability of energy for import from other WSCC subregions, the major transmission paths connecting NWPP to other WSCC subregions are not expected to be significantly loaded any time during the summer of 2001.

However, the reduction of Direct Service Industrial (DSI) demands may cause electricity transfer limits on key NWPP internal paths to be encountered at lower generation levels than has been typical in the past. Of particular concern this summer is the potential for stranding generating capacity due to constraints on the West of Hatwai, Montana-Northwest, and Canada-Northwest paths (WSCC Path 6, Path 8, and Path 3, respectively).

The West of Hatwai path connects generation projects in western Montana, northern Idaho, eastern Washington, and southeastern British Columbia to the west coast cities and the northern collection terminals of the Pacific AC Intertie. At least 700 MW of DSI demand in western Montana and eastern Washington will be curtailed for the duration of summer 2001, and electricity that would have been consumed by these industries will need to be transported to demand centers on the west coast.

A 200 MW DSI reduction just south of the Canadian border on Path 3 will likely reduce the north-to-south available transfer capability of the Canada-Northwest path under specific local demand and generation conditions.

Operating studies were performed incorporating the known DSI demand curtailments and procedures have been developed to ensure continued safe and reliable system operation. In addition, given the reduction in the DSI demands, the NWPP underfrequency load shedding program is being reassessed to ensure ongoing compliance with WSCC's Coordinated Off-Nominal Frequency Load Shedding and Restoration Plan. The DSI demands comprised a significant component of the first several blocks in NWPP's underfrequency load shedding program.

Several new generating projects, which have recently come online or are expected to soon be connected in the province of Alberta, will not likely prove helpful to the rest of the subregion due to internal system limitations that severely constrain transfers out of Alberta during peak loading periods.

Operations
The Pacific Northwest Security Coordinator (PNSC), based in Vancouver, Washington, provides oversight and coordination of operations in the NWPP subregion. The PNSC monitors path loadings against seasonal ratings developed by the Northwest Operational Planning Study Group (NOPSG). The NOPSG seasonal studies are augmented with daily studies performed by the actual transfer path operators to address planned outage conditions.

NWPP created an Emergency Response Team and an Adequacy Response Team to study and address the tight electricity supply conditions encountered in late 2000. These teams remain in place to work with all affected parties to analyze electricity emergencies and to communicate information to utilities, elected officials, and the general public.

NWPP Description

The NWPP subregion of the Western Systems Coordinating Council (WSCC) includes all or most of the states of Washington, Oregon, Idaho, Utah, Wyoming, Montana, Nevada (except for Las Vegas), northern California, and the Canadian provinces of Alberta and British Columbia.